

# 1970

**OPERATING  
SUMMARY**

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## ***SIMCOE***

***water pollution  
control plant***

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ONTARIO WATER RESOURCES COMMISSION

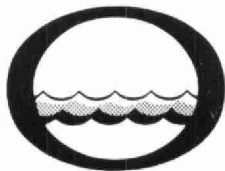
Division of Plant Operations

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*Water management in Ontario*

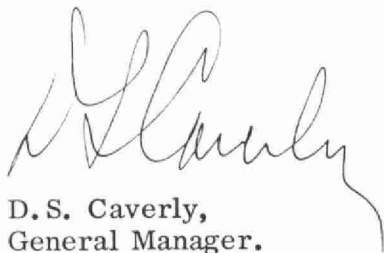
Ontario  
Water Resources  
Commission

135 St. Clair Ave. W.  
Toronto 195  
Ontario


Once again we have the privilege of submitting to you our latest detailed report on financial progress and technical activity at your water pollution control plant.

The statistical information contained in this annual operating summary will undoubtedly be a useful barometer of efficiency. Of particular interest will be the comments and recommendations of the regional operations engineer, who was intimately connected with day-to-day operation throughout 1970.

Together with the extensive cost data provided, this information should assist greatly in your general understanding of the problems met and dealt with, and in furnishing a yardstick for possible future expansion.



D.S. Caverly,  
General Manager.



D.A. McTavish, P. Eng.,  
Director,  
Division of Plant Operations.

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**SIMCOE**  
**water pollution control plant**

operated for

THE TOWN OF SIMCOE

by the

ONTARIO WATER RESOURCES COMMISSION

**1970 ANNUAL OPERATING SUMMARY**

## DESIGN DATA

PROJECT NO.	2-0120-62	TREATMENT	Activated Sludge
DESIGN FLOW	2.0 mgd	DESIGN POPULATION	15,400
BOD - Raw Sewage	220 mg/l	SS - Raw Sewage	230 mg/l
- Removal	90%	- Removal	90%

### RAW SEWAGE PUMPS

- a) Type: Fairbanks-Morse  
Size: One 1200 gpm @ 35' tdh
- b) Type: Smart-Turner  
Size: One 500 gpm @ 35' tdh
- c) Type: Worthington  
Size: Two 2000 gpm @ 50' tdh

### PRETREATMENT (Common)

#### Grit Removal

Type: Dorr Detritor  
Size: One 14' x 14' x 1½' (1,850 gal)  
Retention: 1.33 min

#### Comminution

Type: Barminutor  
Size: Model "C" (24")

### PLANT #1 (0.6 mgd)

#### PRIMARY TREATMENT

##### Primary Sedimentation

Type: Hardinge  
Size: One 50' x 20' x 8' (50,000 gal)  
Retention: 4.31 hr  
Loading: Surface, 600 gal/ft²/day  
Weir, 30,000 gal/ft/day

#### SECONDARY TREATMENT

##### Aeration Tanks

Type: Diffused air, Four pass  
Size: 8 - 12' x 50' x 8' (240,000 gal)  
Retention: 9.6 hr

##### Diffusers

Type: Holes in pipe & spargers

##### Air Supply

Type: Roots-Connersville  
Size: Two 1200 scfm

### Secondary Sedimentation

Type: Dorr  
Size: One 46' (hex) x 9½' swd (98,600 gal)  
Retention: 3.16 @ design flow with 25%  
return sludge  
Loading: Surface, 360 gal/ft<sup>2</sup>/day  
Weir, 4150 gal/ft/day

### CHLORINATION

Type: W & T  
Size: One 400 lb/day

### Chlorine Contact Chamber

Size: One 18' x 14½' x 6' (6,800 gal)  
Retention: 16.4 min

PLANT #2 (1.4 mgd)

### PRIMARY TREATMENT

#### Primary Sedimentation

Type: Dorr  
Size: Two 45' dia x 10' swd (198,000 gal)  
Retention: 3.4 hr  
Loading: Surface, 440 gal/ft<sup>2</sup>/day  
Weir, 5570 gal/ft/day

### SECONDARY TREATMENT

#### Aeration Tanks

Type: Diffused air; single-pass  
Size: Two 98' x 25' x 12½' (369,150 gal)  
Retention: 6.3 hr

#### Diffusers

Type: Inka

### Air Supply

Type: Dorr  
Size: Two 5508 scfm

### Secondary Sedimentation

Type: Dorr  
Size: Two 45' dia x 10' swd (198,000 gal)  
Retention: 3.4 hr  
Loading: Surface, 440 gal/ft<sup>2</sup>/day  
Weir, 5570 gal/ft/day

### CHLORINATION

#### Chlorine Contact Chamber

Size: 15' x 20.6' x 8.2' (15,700 gal)  
Retention: 16 min

### OUTFALL (Common)

- to Lynn River

### SLUDGE HANDLING (Common)

#### Digestion System - two-stage

Primary --

Type: PFT; gas mixed (Pearth floating cover)

Size: One 50' dia x 20' swd (43,250 cu ft or 270,000 gal)

Loading: 2.86 lb/cu ft/mo

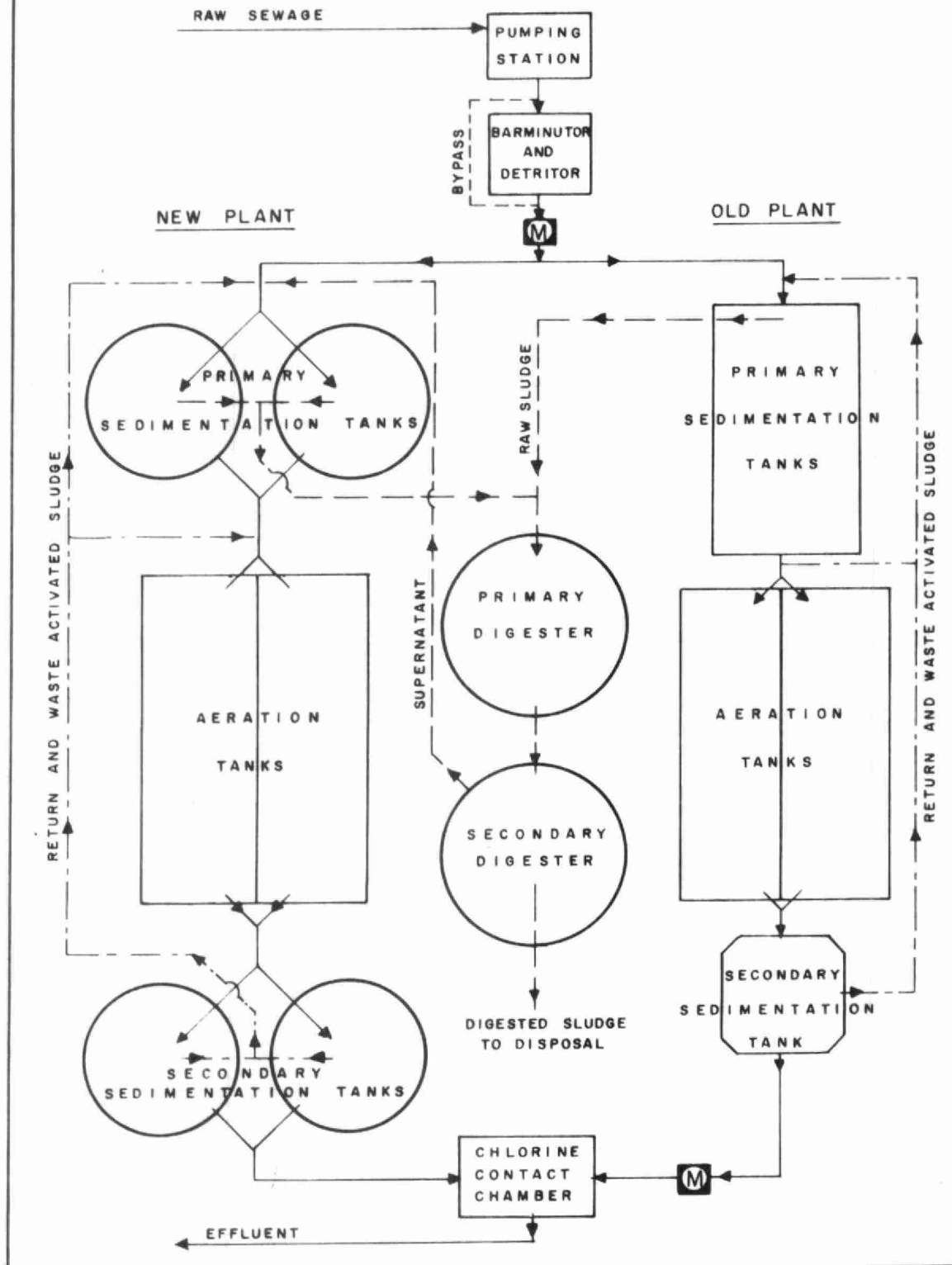
Secondary --

Type: PFT

Size: One 50' dia x 20' swd (43,250 cu ft or 270,000 gal)

Total Loading: 1.43 lb/cu ft/mo

# SIMCOE WATER POLLUTION CONTROL PLANT





# '70 REVIEW

FLOWS	DAILY FLOW mil gal	OCCURRING IN THE MONTH OF	MONTHLY FLOW mil gal	OCCURRING IN THE MONTH OF
Average	1.90	—	57.7	—
High	2.8	December	66.3	December
Low	1.2	January	47.7	January

## GENERAL

This project is composed essentially of two separate activated sludge treatment plants which share common raw sewage pumping, influent works, digestions and chlorination facilities. One plant of 0.6 mgd capacity was put in operation in 1956, and the second plant of 1.4 mgd capacity, was started up in August, 1964. The old plant is operated by the OWRC, but is not a Commission-financed plant. The aeration section of the new plant is equipped with an Inka diffusion system.

During 1970, the Town passed a sewer-use by-law and as a result the shock loading from the local industries has been substantially reduced.

## PLANT FLOWS and CHLORINATION

The total gallonage treated in 1970 was 692.1 million. The plant operated at 95% hydraulic capacity over the year, at 107% during the peak month and 140% during the peak day. From the flow probability graph, it can be seen that the design capacity of the plant was exceeded 40% of the time.

The final effluent was chlorinated for the 10 months of the year. A total 16,800 pounds of chlorine was used at an average dosage of 3.2 mg/l. The average chlorine residual was 0.5 mg/l in the final effluent prior to discharge into the Lynn River.

## EXPENDITURES

The operating cost for the year was \$62,747.30 or 3 cents per pound of BOD removed. The unit cost of treating one million gallons was \$90.70.

## PLANT LOADING and EFFICIENCY

The average raw sewage strengths in 1970 were 289 mg/l BOD and 205 mg/l suspended solids. The average strengths in the final effluent of 10 mg/l BOD and 9 mg/l suspended solids, represented removal efficiencies of 97% and 96% respectively. The final effluent met the OWRC objectives approximately 90% of the time for BOD and 90% of the time for suspended solids.

Approximately 1.93 million pounds of BOD and 1.36 million pounds of suspended solids were removed during the year. The primary effluent in the old plant had an average strength of 218 mg/l and 101 mg/l suspended solids, representing percent removals of 24% and 51% in the primary section of the plant. The primary effluent in the new plant had an average strength of 221 mg/l and 183 mg/l suspended solids representing percent removals of 24% and 11% in the primary section of the plant.

A total of 17.3 cubic yards of grit was removed. This represents a removal quantity of 0.67 cubic feet per million gallons which is normal for this type of plant.

## SLUDGE DIGESTION and DISPOSAL

A total of 3.9 million gallons of raw sludge was pumped to the digester. A total of 1.99 million gallons of digested sludge at an average concentration of 2.2% was trucked away or centrifuged. This amounted 50 51% of the raw sludge pumped to the digester of .71 cubic yard per million gallons of raw sewage.

## AERATION

### Old Plant

The average BOD entering the aeration section was 218 mg/l and the average loading of .27 pounds of BOD per pound of MLSS. An average of 2100 cubic feet of air was supplied per pound of BOD removed.

### New Plant

The average BOD entering the aeration section was 221 mg/l and the average loading of .41 pounds of BOD per pound of MLSS. An average of 4200 cubic feet of air was supplied per pound of BOD removed.

## CONCLUSIONS

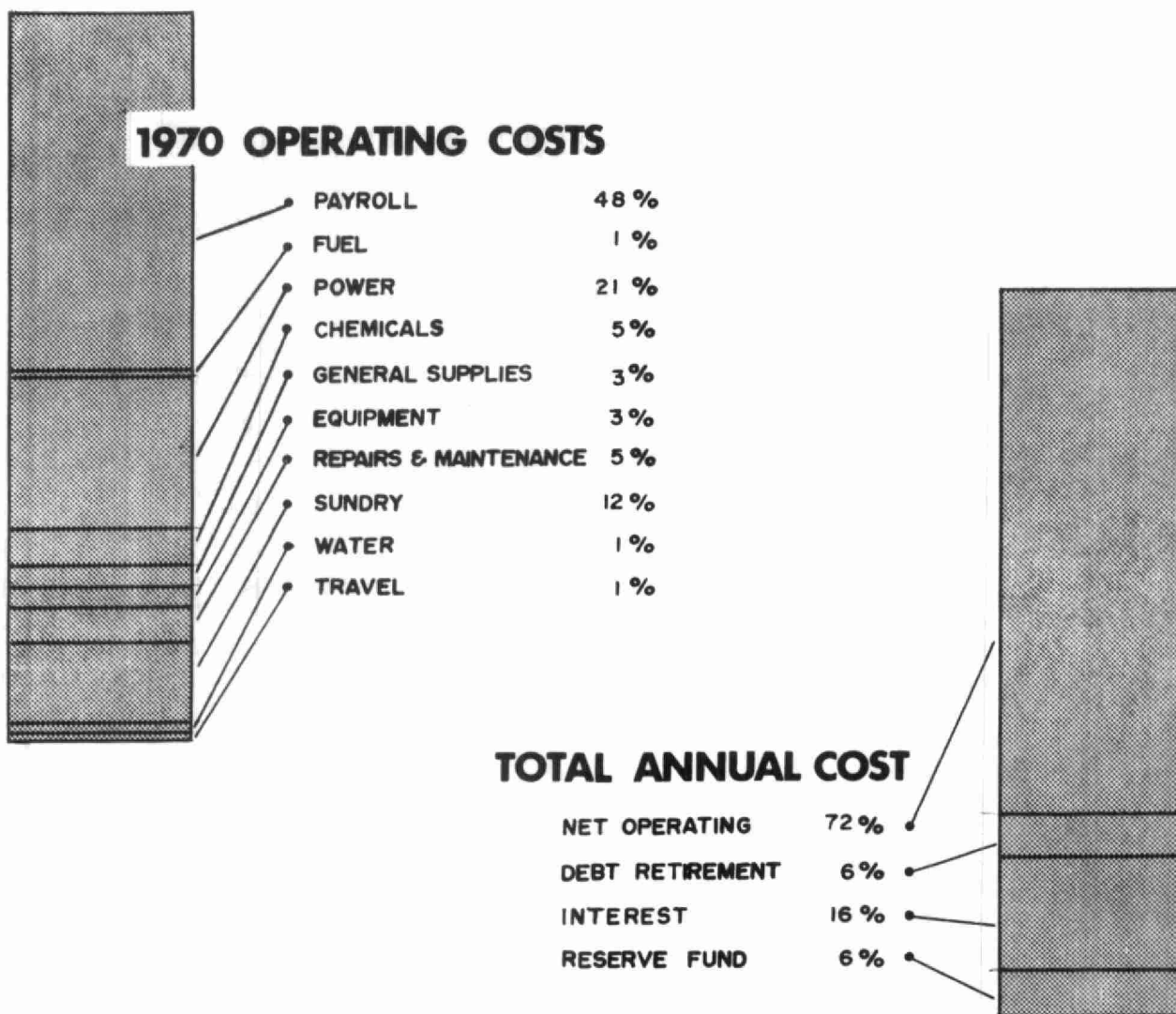
Throughout 1970 this project was well run and experienced no major operating difficulties. During the summer of this year the disposal of sludge became the responsibility of the OWRC and as a result the operating costs were higher. In addition a centrifuge was tested for dewatering sludge and subsequently a centrifuge has been purchased. A consulting engineering firm is presently designing the expansion of the facilities in order that growth of the Town will not be restricted.

## PROJECT COSTS

NET CAPITAL COST (Final)	\$694,205.44
DEDUCT - Portion financed by CMHC/MDLB (Final)	<u>447,495.04</u>
Long Term Debt to OWRC	<u>\$246,710.40</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1970	\$ <u>47,156.12</u>
Net Operating	\$ 63,665.88
Debt Retirement	4,979.00
Reserve	4,928.55
Interest Charged	<u>13,822.25</u>
TOTAL	\$ <u>87,395.68</u>

### RESERVE ACCOUNT

Balance @ January 1, 1970	\$ 38,696.26
Deposited by Municipality	4,928.55
Interest Earned	<u>2,576.34</u>
	\$ 46,201.15
Less Expenditures	<u>2,537.07</u>
Balance @ December 31, 1970	\$ <u>43,664.08</u>



### Yearly Operating Costs

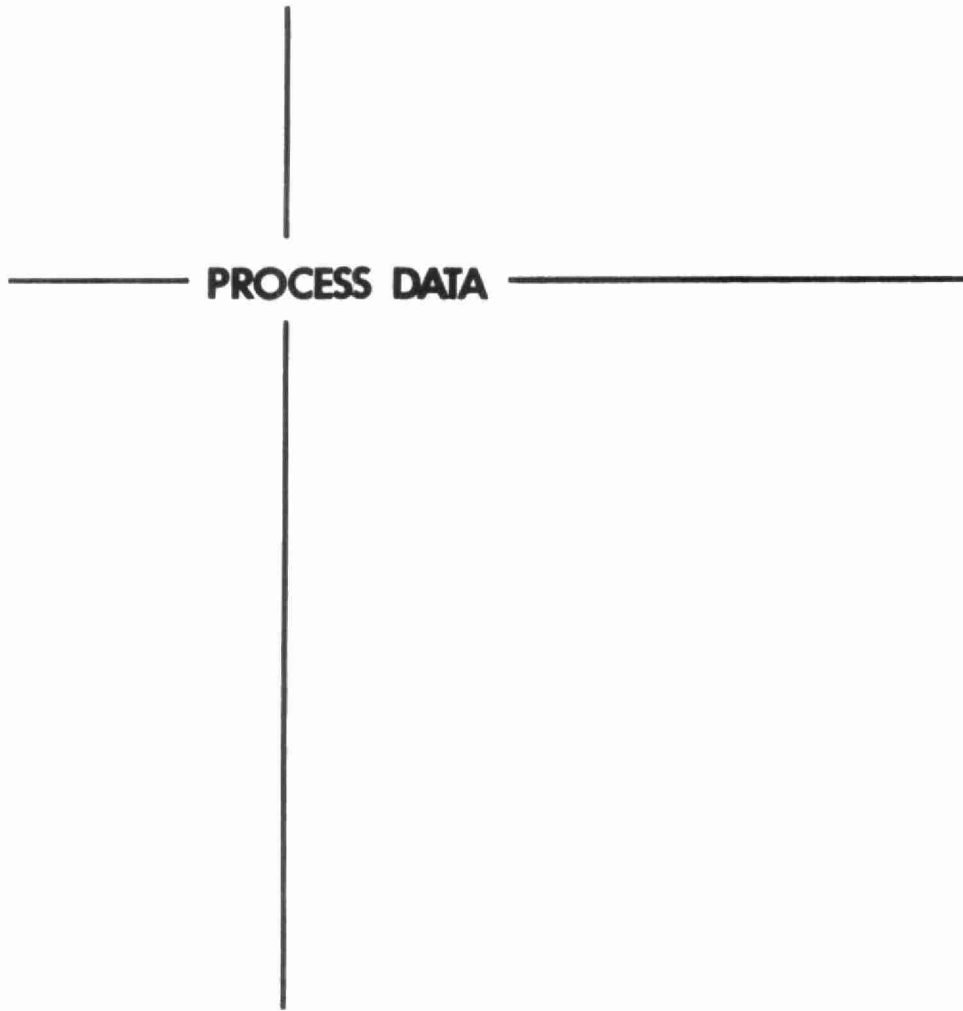
YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1966	628.39	\$42,874.24	\$68.23	3 cents
1967	621.10	45,987.82	74.04	3 cents
1968	654.82	46,216.84	70.58	3 cents
1969	627.50	50,722.79	80.83	3 cents
1970	692.1	62,747.30	90.70	3 cents

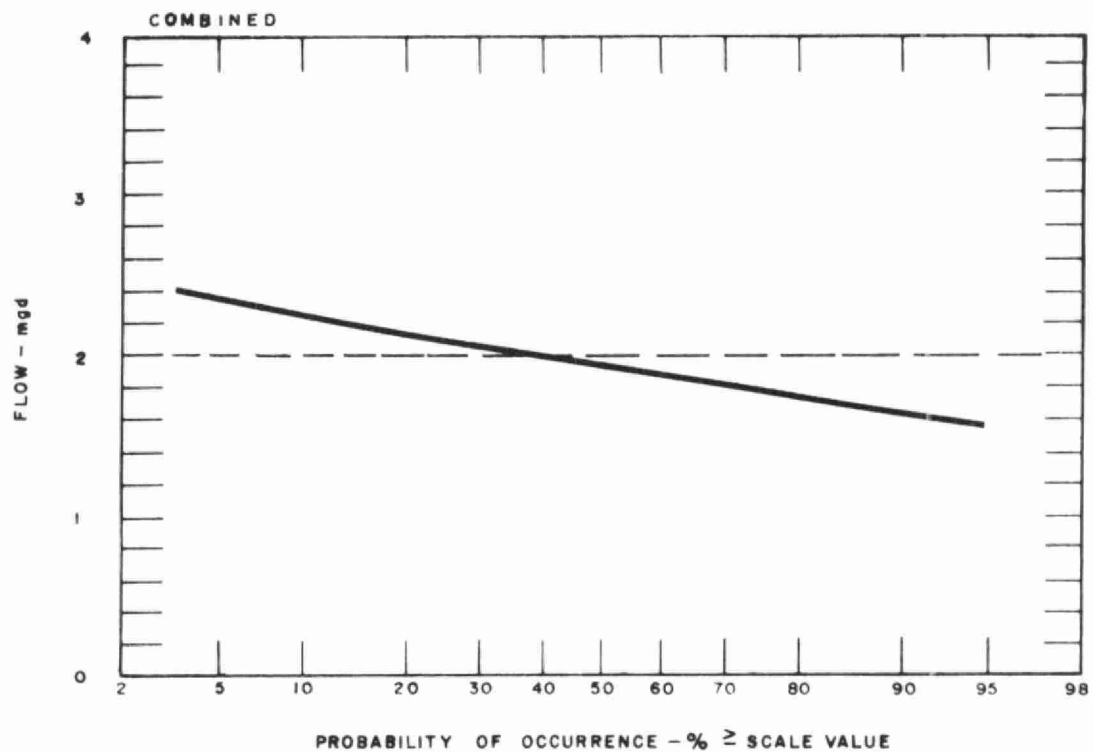
## MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	3135.85	2894.85	-	-	-	-	113.70	84.71	4.20	27.29	-	11.10
FEB	4082.71	1808.01	-	242.47	1195.45	-	138.84	88.00	506.42	21.57	58.25	23.70
MAR	4490.30	2705.69	-	-	1178.45	-	154.81	-	325.28	27.92	58.25	39.90
APR	3900.83	2299.78	-	-	834.50	-	124.01	74.76	442.42	27.06	58.25	40.05
MAY	6172.54	2525.87	-	-	1981.35	766.64	283.57	265.13	222.58	21.15	58.25	48.00
JUNE	2639.52	2312.29	-	-	-	-	98.15	-	79.72	83.85	-	65.51
JULY	6172.17	2249.08	-	158.05	827.60	541.03	153.28	525.75	68.10	1402.18	58.25	188.85
AUG	5730.32	3452.25	-	-	749.40	290.60	72.94	535.09	453.59	81.60	58.25	36.60
SEPT	5090.97	2441.19	81.42	-	1051.00	145.30	311.72	81.96	15.75	829.83	58.25	74.55
OCT	6354.44	2296.78	-	-	1281.80	515.99	127.55	76.00	257.11	1726.41	58.25	14.55
NOV	7789.67	2315.28	-	-	1108.60	581.19	111.26	22.95	593.04	2955.15	58.25	43.95
DEC	7187.98	2317.05	-	185.79	2694.20	406.83	345.36	297.04	213.98	566.03	116.50	45.15
TOTAL	62747.30	29618.12	81.42	586.31	12902.35	3247.58	2035.19	2051.39	3182.19	7770.09	640.75	631.91

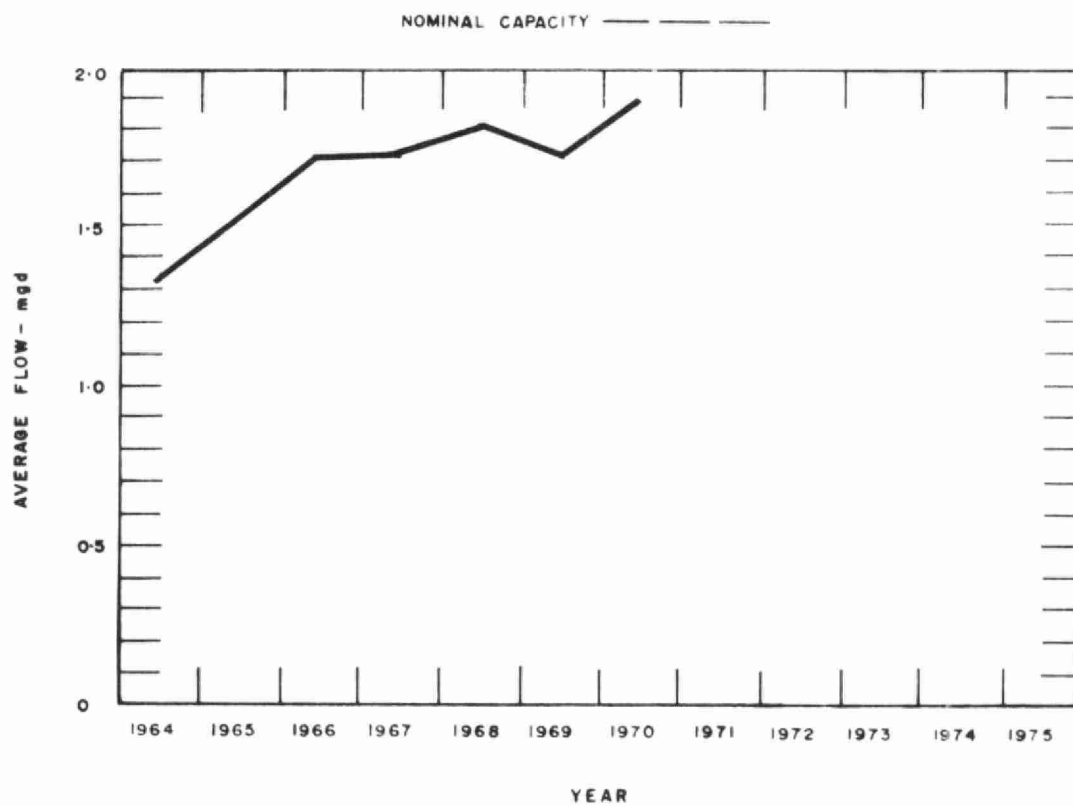
BRACKETS INDICATE CREDIT

\* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE





## FLAWS



## PLANT FLOWS and CHLORINATION

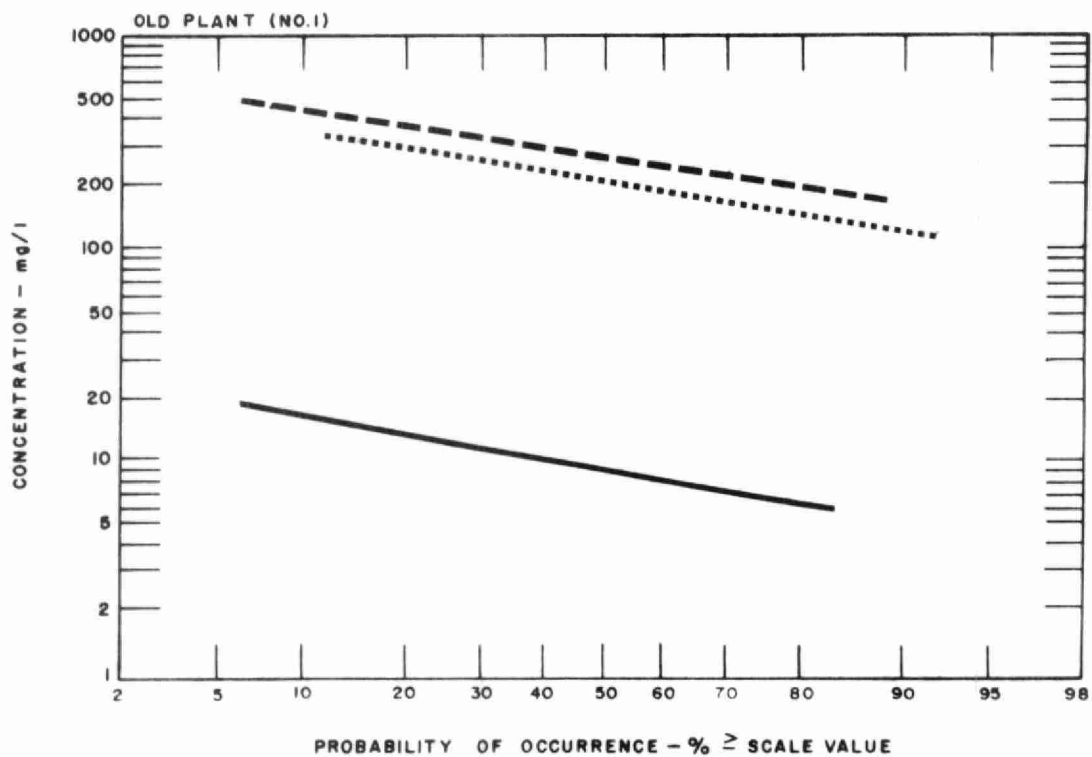
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED 10 <sup>3</sup> pounds	DOSAGE mg/l
JAN	47.7	1.54	1.8	1.2	-	-
FEB	52.9	1.89	2.2	1.6	-	-
MAR	59.3	1.91	2.5	1.6	.1	1.0
APR	59.7	1.99	2.4	1.7	1.8	3.0
MAY	58.6	1.89	2.2	1.7	1.6	2.7
JUNE	53.4	1.78	1.9	1.6	1.8	3.3
JULY	54.0	1.74	2.0	1.5	2.1	3.9
AUG	54.4	1.76	2.1	1.8	1.9	3.1
SEPT	61.3	2.04	2.4	1.7	2.1	4.7
OCT	59.5	1.92	2.2	1.6	1.4	3.0
NOV	65.0	2.17	2.5	1.8	1.9	3.0
DEC	66.3	2.14	2.8	1.7	2.1	3.2
TOTAL	692.1	-	-	-	16.8	-
AVERAGE	-	1.90	-	-	1.9	3.2



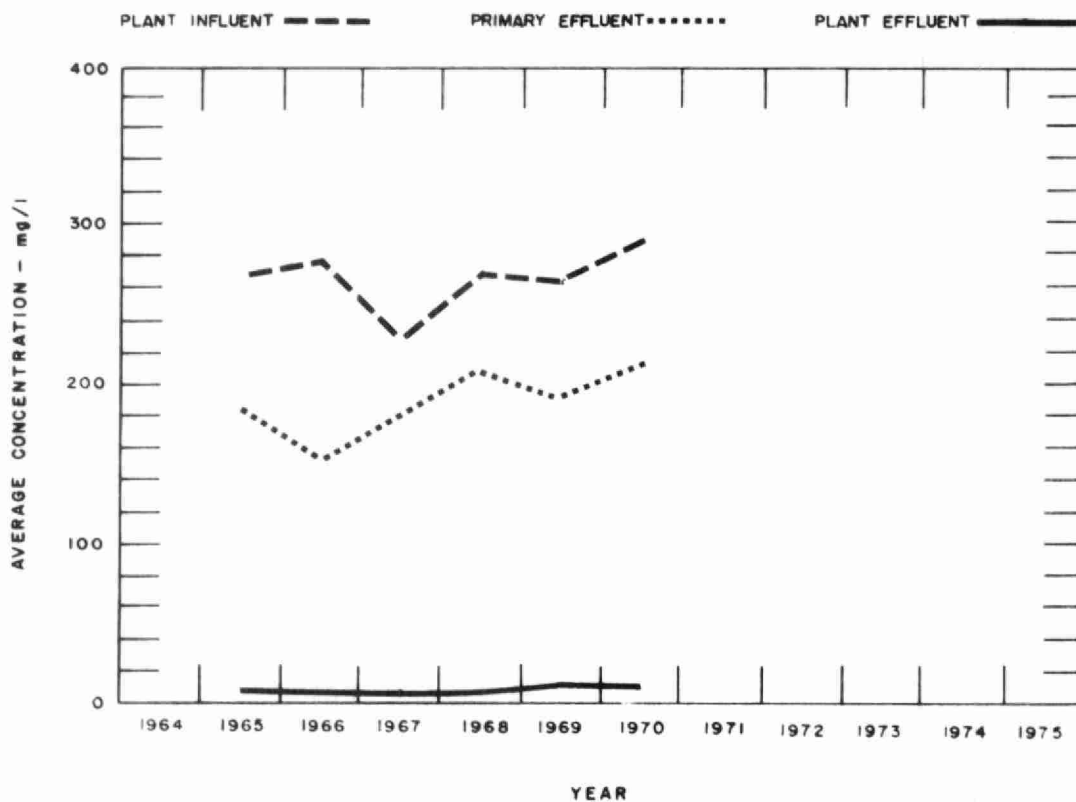
## PLANT EFFICIENCY

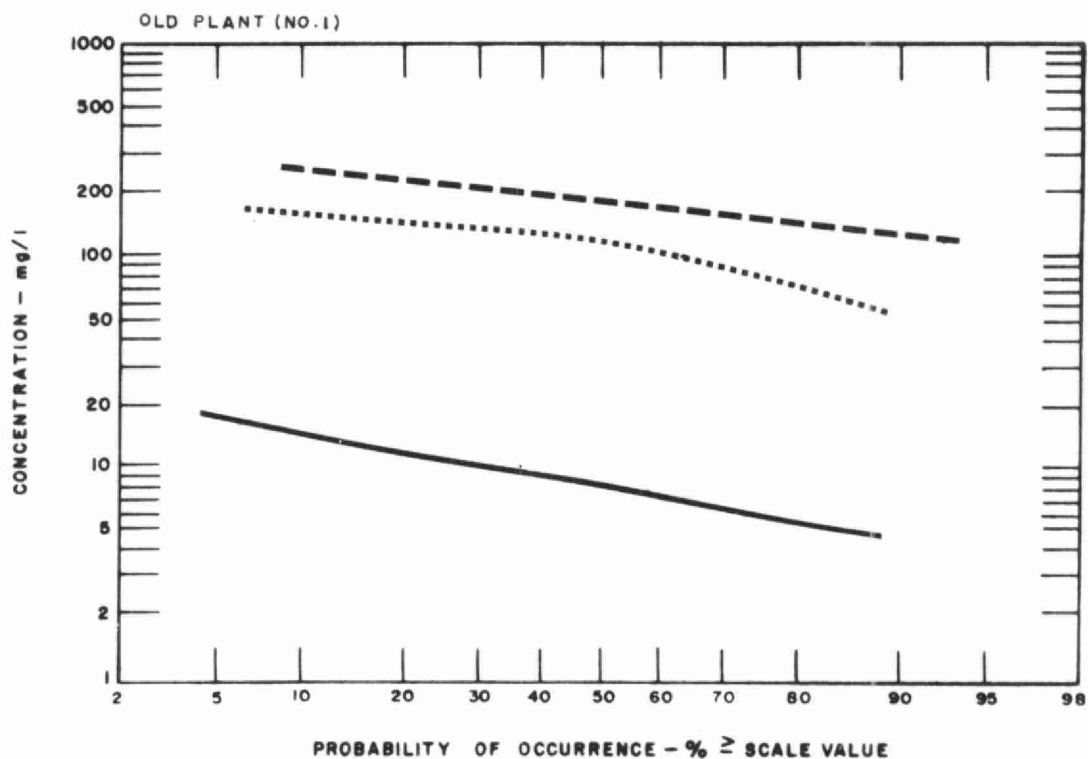
MONTH	BIOCHEMICAL OXYGEN DEMAND						SUSPENDED SOLIDS						GRIT REMOVED  cu ft
	INFLUENT		EFFLUENT		REDUCTION		INFLUENT		EFFLUENT		REDUCTION		
	n	mg/l	n	mg/l	%	10 <sup>5</sup> pounds	n	mg/l	n	mg/l	%	10 <sup>5</sup> pounds	
JAN	3	277	3	15	95	1.3	3	191	21	9	95	.9	36
FEB	2	390	2	16	96	2.0	2	224	21	8	96	1.1	33
MAR	2	390	2	9	98	2.3	3	189	32	8	96	1.1	35
APR	3	277	3	7	97	1.6	6	174	36	11	94	1.0	34
MAY	0	-	0	-	-	-	0	-	20	9	-	-	37
JUNE	3	242	1	5	98	1.3	2	127	29	8	94	.6	33
JULY	1	280	1	5	98	1.5	1	204	17	9	96	1.1	39
AUG	2	260	2	17	93	1.3	2	222	8	8	96	1.2	39
SEPT	1	340	1	9	97	1.9	1	170	1	4	98	1.0	48
OCT	1	260	1	6	98	1.5	1	180	1	11	94	1.0	41
NOV	4	252	4	7	97	1.6	4	315	4	15	95	2.0	46
DEC	2	290	2	9	97	1.9	2	180	2	10	94	1.1	46
TOTAL	24	-	22	-	-	-	27	-	192	-	-	-	467
AVERAGE	-	289	-	10	97	1.7	-	205	-	9	96	1.1	39

NOTE - n is the number of samples taken

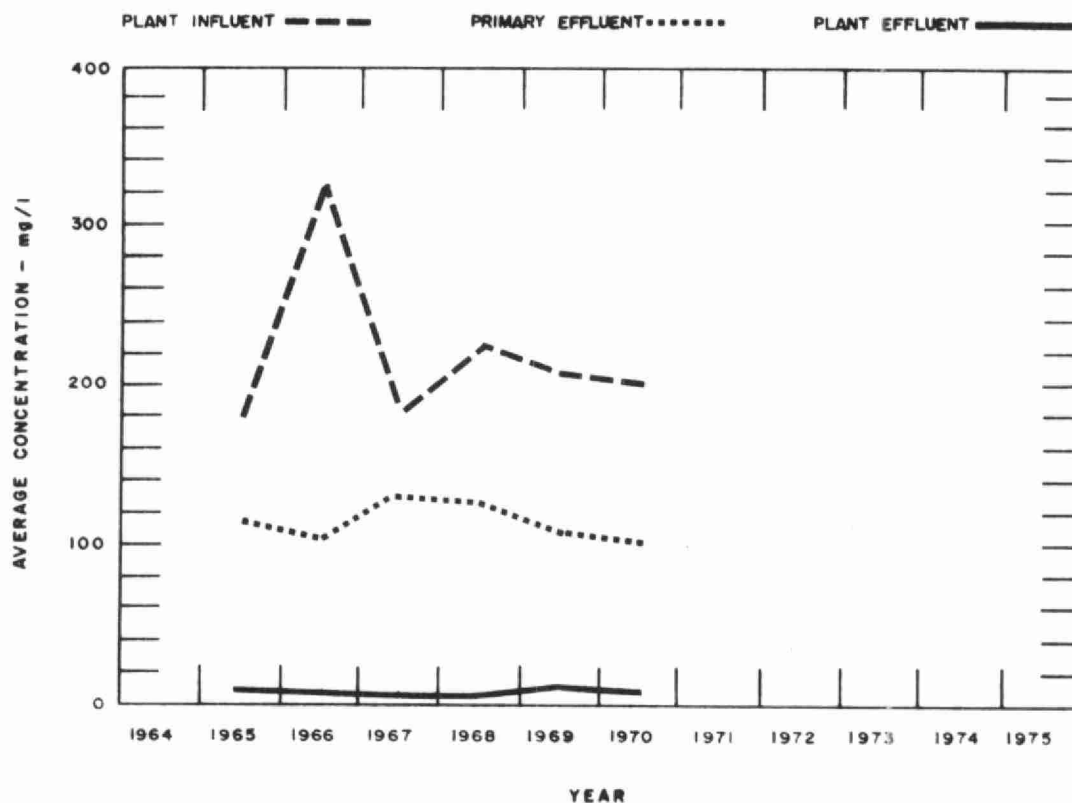


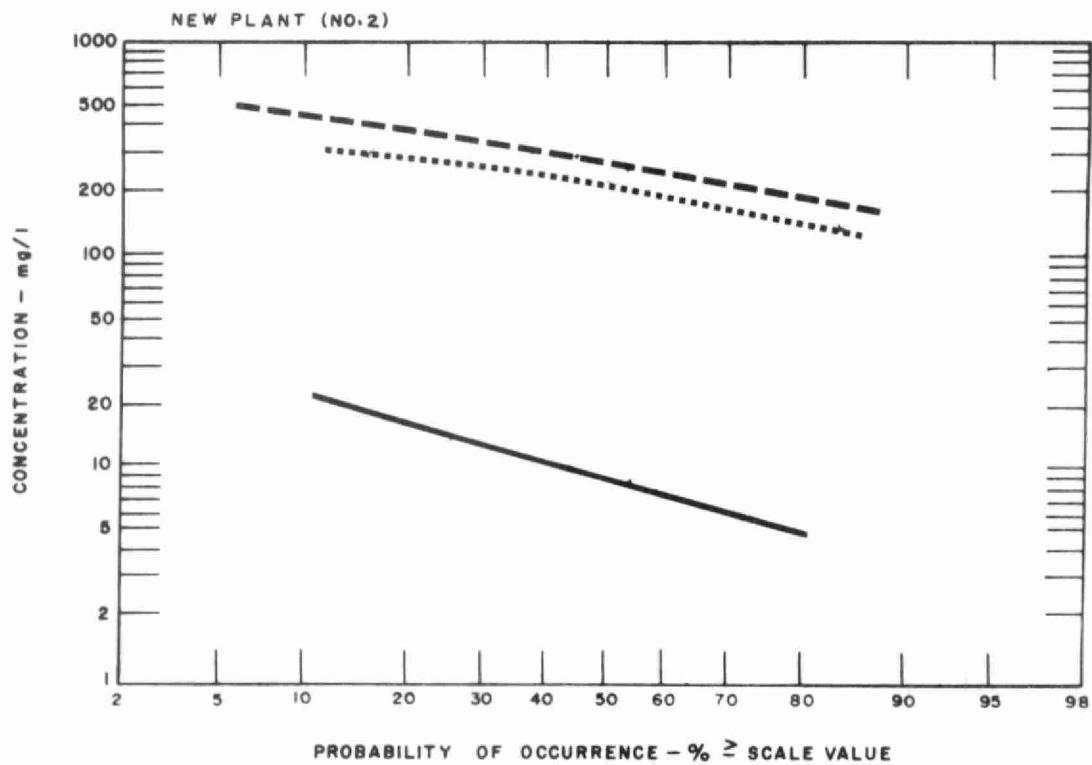
## BIOCHEMICAL OXYGEN DEMAND



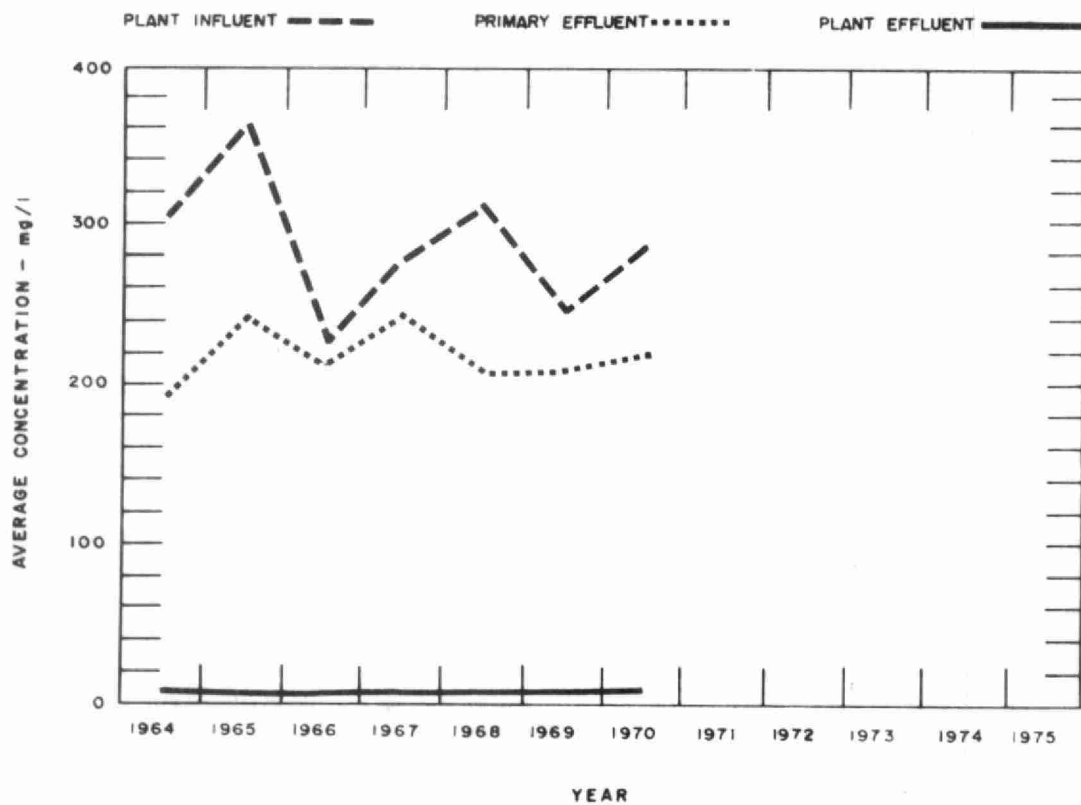


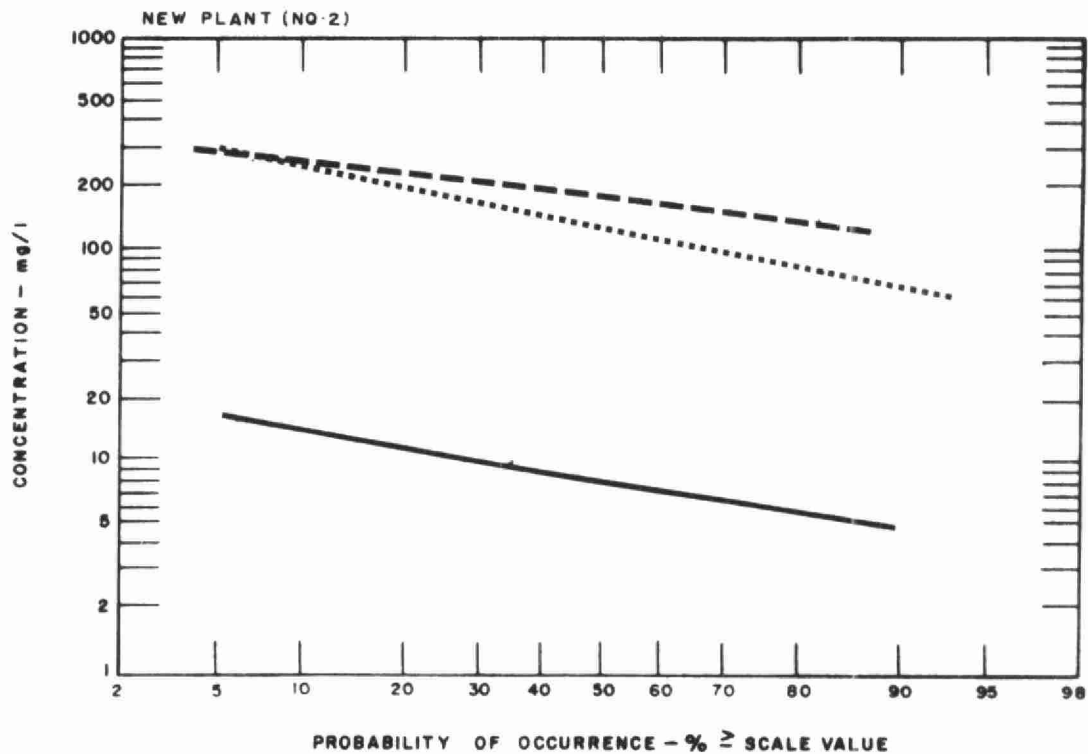
## SUSPENDED SOLIDS



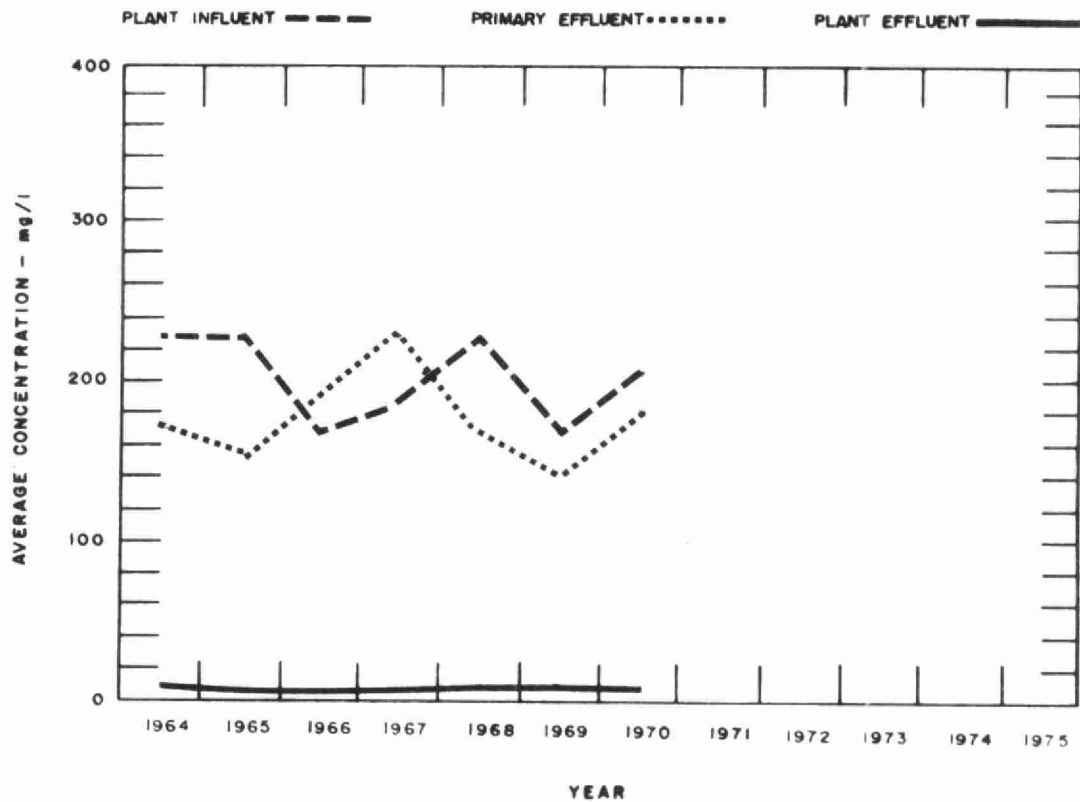


## BIOCHEMICAL OXYGEN DEMAND





## SUSPENDED SOLIDS

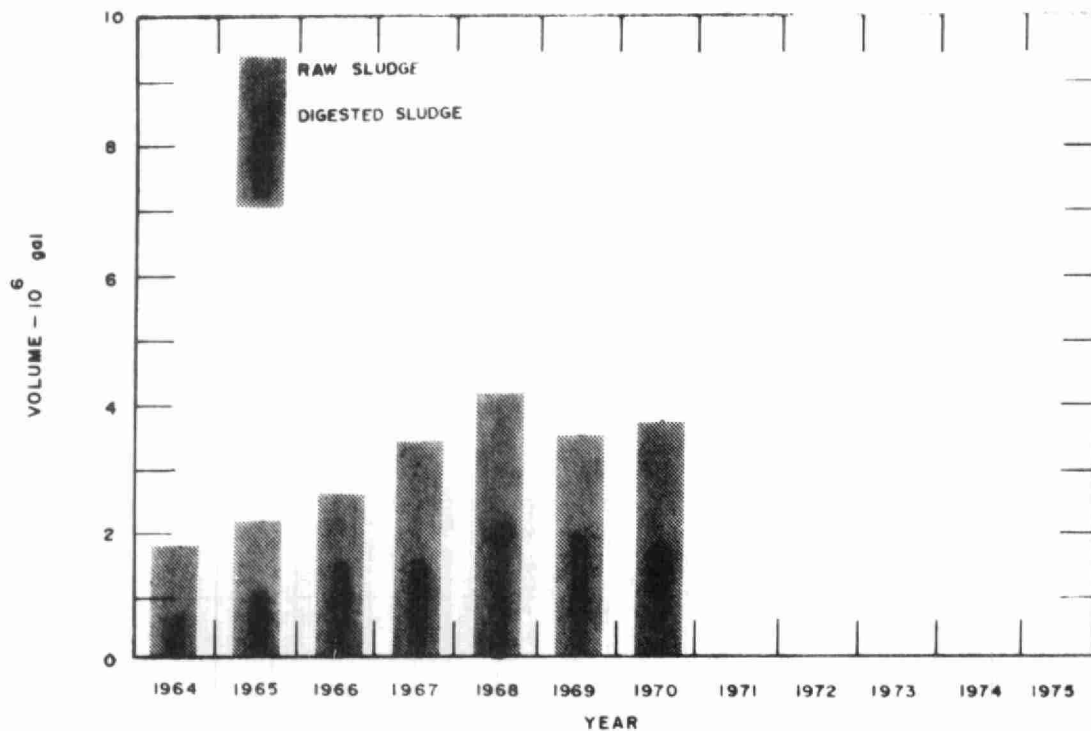


## AERATION

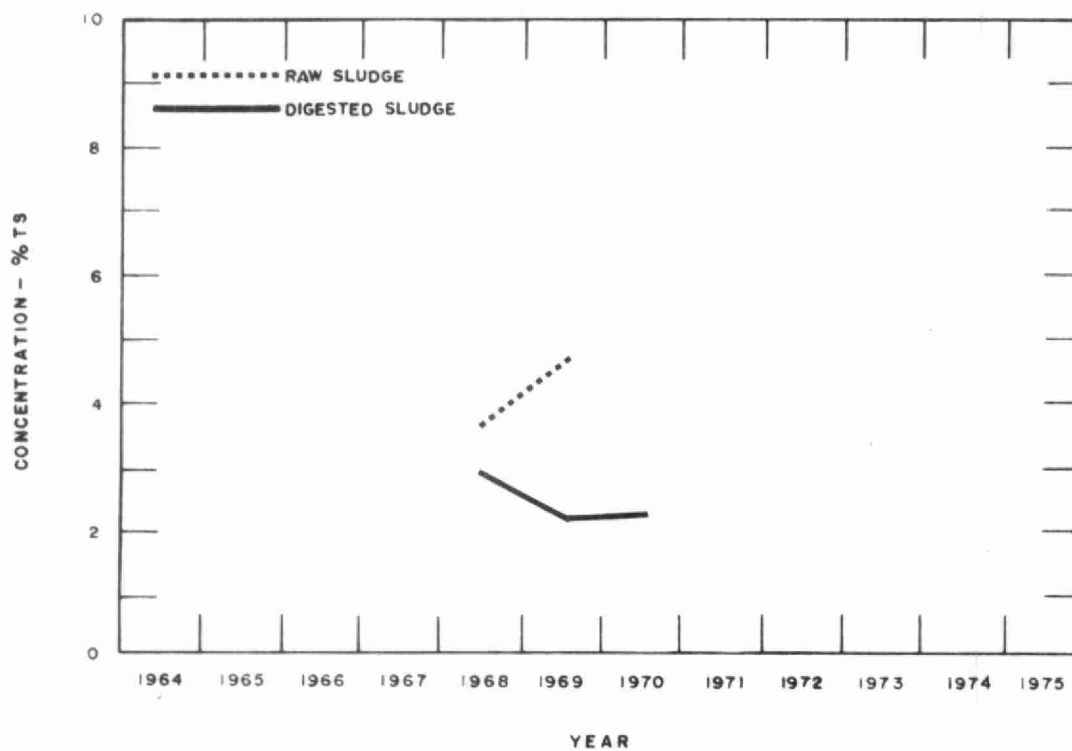
MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		MLSS CONCN mg/l	F/M lb BOD lb MLSS	AIR USED 1000 cu ft lb BOD	WASTE SLUDGE 10 <sup>3</sup> lb/DAY
		BOD	SS	BOD	SS				
		mg/l	mg/l	mg/l	mg/l				
JAN	.48	220	95	15	9	1520	.29	2.60	-
FEB	.53	320	190	9	7	2090	.34	1.1	7.5
MAR	.50	340	71	7	7	2930	.24	1.0	9.8
APR	.60	130	92	9	11	3050	.11	2.4	7.9
MAY	.57	-	-	-	9	3030	-	-	.6
JUNE	.51	177	31	-	9	3510	.11	-	1.2
JULY	.55	140	104	5	8	2160	.15	2.8	-
AUG	.50	-	-	-	4	2290	-	-	.77
SEPT	.56	365	130	9	4	1080	.75	1.8	.47
OCT	.55	-	-	-	-	2380	-	-	.06
NOV	.68	163	107	10	15	3220	.14	3.4	.08
DEC	.71	260	140	12	5	2550	.30	1.8	.06
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	.57	218	101	10	9	2480	.27	2.1	

## AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		MLSS CONCN mg/l	F/M lb BOD lb MLSS	AIR USED 1000 cu ft lb BOD	WASTE SLUDGE lb/DAY
		BOD	SS	BOD	SS				
		mg/l	mg/l	mg/l	mg/l				
JAN	1.06	260	106	16	9	1610	.46	3.5	590
FEB	1.36	220	156	24	9	2290	.35	5.7	440
MAR	1.41	180	137	12	9	2390	.29	6.1	970
APR	1.39	200	104	6	11	1950	.38	3.7	510
MAY	1.32	-	-	-	8	2080	-	-	410
JUNE	1.27	132	94	5	7	1950	.23	4.1	300
JULY	1.19	-	-	-	10	1800	-	-	-
AUG	1.25	245	185	17	11	1920	.44	3.6	1360
SEPT	1.48	-	-	-	-	-	-	-	1600
OCT	1.37	300	326	6	11	2150	.52	3.6	970
NOV	1.48	260	340	3	15	2000	.52	3.8	930
DEC	1.43	280	650	7	15	2250	.48	3.7	1050
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	1.33	221	183	11	9	2040	.41	4.2	



## DIGESTION





## SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME	TOTAL SOLIDS	VOL SOLIDS	VOLUME	TOTAL SOLIDS	VOL SOLIDS	VOLUME	TOTAL SOLIDS	DEWATERED	LIQUID
	10 gal	%	%	10 gal	%	%	10 gal	%	cu yd	cu yd
JAN	3.0	-	-	1.89	2.1	58	-	-	-	1062
FEB	2.8	-	-	1.5	2.5	64	-	-	-	919
MAR	3.3	-	-	2.2	2.3	62	-	-	-	1306
APR	3.2	-	-	2.3	2.3	60	-	-	-	1339
MAY	3.3	-	-	2.2	-	-	-	-	-	1318
JUNE	2.6	-	-	2.4	-	-	-	-	-	1402
JULY	3.5	-	-	2.2	-	-	-	-	-	1326
AUG	3.6	-	-	2.2	-	-	-	-	-	1314
SEPT	3.5	-	-	.6	-	-	-	-	403	375
OCT	3.6	-	-	.6	1.8	59	-	-	136	349
NOV	3.2	-	-	1.3	-	-	-	-	-	778
DEC	3.3	-	-	.5	-	-	-	-	386	326
TOTAL	39.0	-	-	19.9	-	-	-	-	-	11814
AVERAGE	3.3	-	-	1.7	2.2	61	-	-	-	-

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